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Assessing the toxic effect of 2,4,6-trinitrotoluene on cells of Escherichia coli K12 by flow cytofluorometry

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Abstract

The magnitude of transmembrane potential Δψ in cells of Escherichia coli K12 was determined by the method of flow cytofluorometry for different phases of growth. It was large in the log phase, whereas in the lag and stationary phases, the population was shown to consist of two subpopulations with low and large values of Δψ in cells. In the presence of 200 mg/l of 2,4,6-trinitrotoluene (TNT), this bimodal distribution of Δψ over the population was observed during the entire growth period until TNT was almost completely eliminated from the cultivation medium (to a concentration of 18-20 mg/l). The mean value of Δψ in cells of the population grown in the presence of TNT was substantially smaller than that in controls due to the larger fraction of the subpopulation with a low value of Δψ. Upon elimination of TNT, the distribution of Δψ in cells of the culture became unimodal and close to that in the control culture in the early log phase of growth. These findings are discussed from the standpoint that considers heterogeneity of the culture of Escherichia coli K12 as a mechanism of its adaptation to the presence of xenobiotics. © Nauka/Interperiodica 2007.

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Keywords

Escherichia coli K12, 2,4,6-trinitrotoluene, Flow cytofluorometry, Toxicity